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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/555,447	11/03/2005	Akiko Fujino	043888-0411	4156
53080 7590 10/25/2007 MCDERMOTT WILL & EMERY LLP 600 13TH STREET, NW WASHINGTON, DC 20005-3096			EXAMINER WANG, EUGENIA	
			ART UNIT 1795	PAPER NUMBER
			MAIL DATE 10/25/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/555,447	<b>Applicant(s)</b> FUJINO ET AL.	
	<b>Examiner</b> Eugenia Wang	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

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## DETAILED ACTION

### *Response to Amendment*

1. In response to the amendment received on September 27, 2007:
  - a. Claims 1-8 are pending.
  - b. The previous 112 rejection has been withdrawn in light of the amendment.
  - c. The previous rejection is maintained, thus this action is final.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1, 2, and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6287720 (Yamashita et al.) in view of US 6,576,366 (Fujiwara et al.).

As to claim 1 Yamashita et al. teach a nonaqueous secondary battery with a nonaqueous electrolyte with a positive electrode comprising cathode active material, a negative electrode comprising anode active material, and a separator disposed between the positive and negative electrodes, operatively with the electrolyte (col. 5, lines 8-23). Furthermore, Yamashita et al. exemplify a lithium ion secondary battery with a cathode active material made of a composite of a lithium oxide (col. 11, lines 7-10). An anode active material inherently has the property of absorbing and desorbing lithium. Example 6 has a separator [13B] made of polyethylene (col. 30, lines 63-66). Additionally, example 6 has a second layer of the separator that acts as a porous film [13A] made of insulating substance (filler)  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> and binder polyvinylidene fluoride (PVDF), where the porous film [13A] is directly formed on the cathode active material layer [11b] (col. 29, lines 51-58; col. 30, lines 5-8).

Yamashita et al. does not teach that the separator comprises a non-woven fabric.

However, Fujiwara et al. teaches a non-aqueous electrolyte secondary cell (title). In the teaching, materials of separators are disclosed including olefin polymers, such as polyethylene (as used by Yamashita et al. in example 6), and non-woven cloth (col. 9, lines 27-38). It would have been obvious to one having ordinary skill in the art at the

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time the invention was made to use the non-woven cloth taught by Fujiwara et al. for the separator of Yamashita et al.'s battery, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

As to claims 2 and 5, Yamashita et al. teaches a separator [13A, 13B] with a thickness between 100 nm to 100  $\mu\text{m}$ .

Yamashita et al. does not mention the thicknesses of each individual section of the separator: 15  $\mu\text{m}$  to 50  $\mu\text{m}$  for the non-woven fabric [13B] and 0.5  $\mu\text{m}$  to 20  $\mu\text{m}$  [13A] for the porous film layer (as applied to claims 2 and 5, respectively). The combined range of these two sections yields between 15.5  $\mu\text{m}$  to 70  $\mu\text{m}$ .

It would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to make Yamashita et al.'s separator with the ranges specified by claims 2 and 5, as it has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985). Additionally, claims that differ from the prior art only by slightly different (non-overlapping) ranges are prima facie obvious without a showing that the claimed range achieves unexpected results relative to the prior art. (*In re Woodruff*, 16 USPQ2d 1935,1937 (Fed. Cir. 1990))

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As to claim 6, Yamashita et al. teaches different binders. Examples include PVDF (as used in previously cited example 6) and acrylonitrile-butadiene (copolymer latex) (col. 7, lines 59-65).

As to claim 7, the weight ratio of  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> to PVDF is 100/5. Therefore, the weight percentage is:

$$\frac{wt\_alumina}{total\_wt} = \frac{100}{100 + 5} * 100\% = 95.2\%$$

As to claim 8, Yamashita et al. teaches that Figs. 7(a) to (c) show with all of the structural attributes of their battery and can additionally be spirally wound to form a spirally wound unit cell (col. 16, lines 41-48).

3. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita et al. and Fujiwara et al., as applied to claim 1, in further view of US 2005/0014064 (Shi et al.).

As to claim 3, the combination of Yamashita et al. and Fujiwara et al. do not teach a non-woven fabric with a melt-down temperature of 150°C or more.

Shi et al. teaches a high melt integrity battery separator for lithium ion batteries (title). The separators are made of nonwoven flat sheets, wherein high temperature melt integrity means that the separator will sustain dimensional stability until a temperature of at least 200°C (abstract; para 0011). The motivation for providing nonwoven flat sheet separators with this characteristic is in order to better maintain dimensional stability within a battery. Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to use the

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materials of Shi et al. (nonwoven flat sheets) in order to improve dimensional stability of the separator at higher temperatures.

As to claim 4, the combination of Yamashita et al. and Fujiwara et al. do not teach the specific type of non-woven fabric used.

Shi et al. teaches nonwoven flat sheets, which are fibers that are held together, used for separators; specific fibers are polyamides and polyimides (para 0013). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the nonwoven flat sheets of Shi et al. as the separator for the battery taught by Fujiwara et al., since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

### ***Response to Arguments***

4. Applicant's arguments filed September 27, 2007 have been fully considered but they are not persuasive.

Applicant argues that the non-woven cloth disclosed in Fujiwara and the porous film used as the separator in Yamashita et al. are completely different material, and thus it would not have been obvious to substitute the porous film with the non-woven cloth of Fujiwara et al.

Examiner respectfully disagrees and would like to clarify the position taken. Yamashita et al. teaches a separator with two layers (seen in fig. 5). As exemplified in Example 6 one layer [13B] made of polyethylene (col. 30, lines 63-66) and a second layer (a porous film) [13A] made of insulating substance (filler)  $\alpha\text{-Al}_2\text{O}_3$  and binder

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polyvinylidene fluoride (PVDF), where the porous film [13A] is directly formed on the cathode active material layer [11b] (col. 29, lines 51-58; col. 30, lines 5-8). Fujiwara et al. is then relied upon to show that non-woven cloths and polyethylene (embodied by Yamashita et al.) are art recognized equivalents for separator material (col. 9, lines 27-38). In this manner it would be obvious to one of ordinary skill in the art to replace the polyethylene layer [13B] in Yamashita et al. with a non-woven cloth.

Applicant (a) argues the combination of Yamashita et al. and Fujiwara et al. would not obtain the separator disclosed in claim 1 and (b) points to tables 1 and 2, comparing example 1 and comparative example 2, stating that the superior cycle characteristics, nail penetration safety, and high temperature safety show unexpected results not disclosed or suggested in the cited prior art.

Examiner respectfully disagrees. With respect to (a), Examiner affirms that the combination of Yamashita et al. and Fujiwara et al. would yield a separator with two layers, a non-woven fabric layer and a porous film layer with an inorganic oxide filler and a binder. In this manner, the combination of Yamashita et al. and Fujiwara et al. provide the characteristics of the claimed separator. With respect to (b), Examiner's position is that although there may be advantages in using both non-woven fabric and a porous substrate that is no showing of how the results of the comparative example 2 are unexpected when compared to that example 1. They are different materials and would be expected to have different properties than the mixture of example 1, which does not even have a common compound in it. Furthermore, it does not show why the combined



invention of prior art of record would not have the same characteristics, as the combined separator has the same features as the claimed invention.

Applicant reiterates the view that the combination of Yamashita et al. and Fujiwara et al. do not teach the claimed subject matter of claim 1.

Examiner respectfully disagrees and points to the rejection of claim 1 as well as the response to the arguments provided above as to how the combination of Yamashita et al. and Fujiwara et al. teach the secondary battery as claimed, especially with respect to the separator.

### ***Conclusion***

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugenia Wang whose telephone number is 571-272-4942. The examiner can normally be reached on 7 - 4:30 Mon. - Thurs., EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EW



**GREGG CANTELMO**  
**PRIMARY EXAMINER**